National Seabird Program 2019 Annual Report

NOAA Fisheries' National Seabird Program (NSP) is a crosscutting group of managers and scientists who work domestically and internationally to protect and conserve seabirds. Our activities are guided by statutes: The National Plan of Action for Reducing the Incidental Catch of Seabirds in Longline Fisheries, Executive Order 13186: Responsibilities of Federal Agencies to Protect Migratory Birds, the Migratory Bird Treaty Act, Magnuson-Stevens Reauthorization Act, Endangered Species Act, National Environmental Policy Act, Oil Pollution Act), and emerging agency priorities (e.g., Ecosystem-Based Fishery Management Policy and Road Map, The National Marine Fisheries Service Climate Science Strategy, Annual Guidance Memoranda). Together, these form the basis for NSP's two overarching goals:

1) Monitor and Mitigate Bycatch – NOAA Fisheries is directly responsible for monitoring and mitigating bycatch in U.S. fisheries and supports a variety of international agreements and Regional Fisheries Management Organizations to mitigate bycatch associated with non-U.S. fisheries.
2) Promote Seabirds as Ecosystem Indicators – Seabirds are excellent indicators of ecosystem status and trends. As highly migratory, near-apex predators, they integrate across trophic levels, space, and time, and are easily studied relative to other marine species.

The NSP works through representation on steering committees and working groups within and external to NOAA Fisheries, and through partnerships with other NOAA Line Offices, Regional Fisheries Management Councils, the States, and other federal agencies (e.g., U.S. Fish and Wildlife Service, U.S. Bureau of Ocean Energy Management, U.S. Geological Survey, U.S. Department of State). Our members work in all five NOAA Fisheries Regional Offices (Alaska Regional Office, Greater Atlantic Regional Fisheries Office, Pacific Islands Regional Office, Southeast Regional Office, & West Coast Regional Office) six Science Centers (Alaska Fisheries Science Center, Northeast Fisheries Science Center, Northwest Fisheries Science Center, Pacific Islands Fisheries Science Center, Southeast Fisheries Science Center, & Southwest Fisheries Science Center) and Headquarters Offices of Protected Resources, Science and Technology, International Affairs and Seafood Inspection, Sustainable Fisheries, Habitat Conservation, General Counsel, and National Ocean Service. As such, we are a nationally coordinated program that benefits from significant leveraging at the regional level.

This report summarizes the significant activities and accomplishments of NSP and its members during 2019. For more information, visit our website: https://www.fisheries.noaa.gov/national/bycatch/seabirds

2019 Accomplishments

Black-footed Albatross. Photo credit: Morgan Richie

Policy and Management

Alaska Regional Office

Seabird streamer line inspection – *NMFS enforcement began examining streamer lines during vessel dockside inspections and requested that U.S. Coast Guard inspect as well.*

Vessel outreach – *Working with the fishing fleet and NOAA Office of Law Enforcement to address vessel-specific seabird bycatch.*

Ecosystem status reports for the Gulf of Alaska and Eastern Bering Sea – *Updated the seabird bycatch sections.*

Marine Stewardship Council – *Provided support for certification reviews. Every five years, the Fisheries Standard is reviewed to incorporate widely accepted new science and fisheries management best practice.*

Streamer line distribution (National Seabird Program funded project) – *Continuing work on regulations and distribution of streamer lines to vessels in Alaska.*

Joseph Krieger
Anne Marie Eich

Alaska Fisheries Science Center

Marine Stewardship Council Certification Review – *Provided support for certification reviews.*

Alaska Salmon Gillnet/Seabird interaction workshop – *Steering committee member and workshop chair; meeting included NOAA, U.S. Fish & Wildlife Service, fishing industry (Alaska gillnet fishers), fishery association (Alaska Fisheries Development Foundation), Birdlife International, and MRAG Americas representatives.*

Shannon Fitzgerald

Northwest Fisheries Science Center

Seabird time-series data – *Provided data to the Olympic Coast National Marine Sanctuary to inform their 2020 Condition Report.*

Jeannette Zamon

Seabird indicator time series analysis – *Calculated and described seabird indicator data (at-sea density, on-colony diet, colony productivity, and beached bird data) for 2019 California Current Integrated Ecosystem Assessment Ecosystem Status Report.*

Tom Good

Provided hook and line gear characterizations and informed longline vessel requirements – *Provided data, including hook and line gear characterizations, and advice to inform policy decisions streamer lines and night setting requirements for longline vessels 26-55 ft in West Coast groundfish fishery.*

Jason Jannot

Streamer lines – *Stored kits in anticipation of high demand once the <55' rule goes into place for the West Coast groundfish fishery; kits will be made available to interested parties at no charge.*

Ryan Shama

Pacific Islands Regional Office

Streamer (tori) lines – *Met with international tori line researchers Daisuke Ochi (Japan) and David Goad (NZ), and Western Pacific Fisheries Management Council staff to review Hawaii tori line design proposals and weigh the merits of streamer-less tori line designs.*

Seabird hook removal – *Adopted ACAP guidelines for safe handling and release of seabirds under the Western and Central Pacific Fisheries Commission (supplement to CMM 2018-03).*

Revised seabird mitigation measure adopted – *Hook shielding devices added as mitigation option and extended the boundary of the southern hemisphere application area from 30S to 25S (CMM 2018-03).*

Emily Crigler

Bait study – *Favorable results of bait study could potentially allow alternative to blue dye for fleet, and potentially reduce bycatch.*

EM Improvements – *Grant secured to enable purchase and review of "bird cam" stern view which could enable development of AI computer vision algorithm, and monitoring protected species strikes on gear utilizing electronic monitoring (EM).*

Colby Brady
Sarah Ellgen

Southwest Fisheries Science Center

California Cooperative Oceanic Fisheries Investigations (CalCOFI) State of the California Current Report – *Summarized and described seabird survey data from CalCOFI and Rockfish Recruitment and Ecosystem Assessment Surveys for State of California Reports.*

Jarrod Santora

Policy and Management

Stellwagen Bank National Marine Sanctuary (NOS)
Great Shearwater necropsy data (National Seabird Program funded project) – *Provided bycatch and plastic locations to University of Rhode Island for collaborative project. Great Shearwaters constitute the largest proportion of bycatch in the sanctuary, the eastern seaboard of the US, and the western North Atlantic.*

Dave Wiley
Kevin Powers,
Anna Robuck
Peter Hong

West Coast Region
Potential Short-tailed Albatross impacts – *Consulted with U.S. Fish & Wildlife on new exempted fishing permit for highly migratory species (deep-set short-line).*

Taylor Debevec

Synergistic Policy and Management

Alaska Fisheries Science Center/Northwest Science Center/Pacific Islands Regional Center
NOAA Pacific Seabird Necropsy Program – *Commercial bycatch seabirds are salvaged and sent to Oikonos for necropsy; salvaged birds provide information on bycatch demographics, food habits, and plastic ingestion, especially for albatross species; data help to inform policy and management decision-making.*

Shannon Fitzgerald - Seabird Program Necropsy Lead

Alaska Regional Office/Alaska Fisheries Science Center
Regional Seabird Bycatch Priority Report – *Prepared for Bycatch Reduction Engineering Program pre-proposal review.*

Anne Marie Eich
Shannon Fitzgerald

Alaska Regional Office/Alaska Fisheries Science Center /International Affairs and Seafood Inspection/Northwest Fisheries Science Center
ACAP briefing preparation – *For U.S. delegation attending working groups and Advisory Committee meetings.*

Anne Marie Eich
Shannon Fitzgerald
Jason Jannot
Mi Ae Kim
Rob Suryan
Jeannette Zamon

Alaska Regional Office/Alaska Fisheries Science Center/Office of Science and Technology/Southwest Fisheries Science Center
Bycatch Reduction Engineering Program – *Conducted proposal review and decision-making for Federal Funding Opportunity.*

Lee Benaka
Anne Marie Eich
Shannon Fitzgerald
Annette Henry
Ryan Shama

National Centers for Coastal Ocean Science/Southwest Fisheries Science Center
Data synthesis and predictive modeling of marine bird spatial distributions on the Pacific Outer Continental Shelf – *NOAA NOS National Centers for Coastal Ocean Science continued its partnership with Josh Adams and Jonathan Felis at U.S. Geological Survey Western Ecological Research Center, Lisa Ballance at Oregon State University Marine Mammal Institute, and many data contributors to synthesize available at-sea visual survey data of marine birds on the Pacific Outer Continental Shelf (OCS); synthesized data will be used to develop predictive models of the spatial distributions for marine bird species within this area.*

Jeffery Leirness
Trevor Joyce

Northwest Fisheries Science Center/West Coast Regional Office
Streamer line/night setting regulations – *Completed implementation plan for regulation of West Coast groundfish longline industry (vessel lengths 25-55 ft) which will go into effect 2020 as recommended by Pacific Fisheries Management Council.*

Tom Good
Jason Jannot
Keeley Kent
Ryan Shama

Research and Fieldwork

Alaska Fisheries Science Center

Seabird training – *Provided training for fishery observers (450+) deployed to commercial fishing vessels in Alaska in support of seabird bycatch assessments and a suite of other activities. Two training sessions on seabird identification and mitigation measures required for research operations also provided; training complies with NEPA rules and ESA Biological Opinions.*

Machine-learning ("AI") Multi-spectral camera seabird identification development – *Working with electronic monitoring development team, necropsy specimens were used in a laboratory setting to evaluate whether electronic monitoring machine learning species identification could work to identify seabirds. With 100% accuracy achieved for black-footed and Laysan albatross, and Northern fulmar, a mock longline retrieval followed with data being analyzed and reported on in 2020.*

NOAA Pacific Seabird Bycatch Necropsy Program (National Seabird Program funded project) – *This ongoing program is a collaboration among two science centers and one regional office. To date, 3,546 seabirds have been necropsied, including 1,706 albatrosses. Necropsy of seabirds supports Marine Bird Food Habits, Marine Bird Plastic Ingestion, and Seabird Bycatch Demographics (see below).*

Marine bird food habits – *Data collection focused on primarily on albatross in Hawaiian pelagic longline fisheries and on Northern fulmars and albatross species in Alaskan Groundfish fisheries. Results support improved understanding of marine food webs and changing oceanic trends, and more clearly identified albatross food habits.*

Marine bird plastic ingestion – *Provided information on the frequency of ingestion and other factors in albatross and Northern fulmars. Additional coordination in 2019 occurred with the National Institute of Standards and Technology under a NOAA cooperative agreement with the Republic of Korea Fisheries Agency to examine chemical uptake of plastics ingested by Northern fulmars in Alaska*

Seabird bycatch demographics – *In addition to basic morphometric data, the age and sex ratios of bycatch can be determined and provided to the U.S. Fish & Wildlife Service to improve estimates of bycatch impact on populations. Additional insight into marine ecosystem processes are becoming known and a suite of other activities are supported. Sampling of tissues supports current work to understanding colony of origin in fulmars, providing important conservation information. Project support included contributions from several field offices.*

Shannon Fitzgerald –
Seabird Program Necropsy Lead

Northwest Fisheries Science Center

Seabird diet sampling (National Seabird Program funded project) – *Resumed seabird diet study off Columbia River Plume in northern CA Current.*

Annual seabird survey (National Seabird Program funded project) – *Conducted as part of Juvenile Salmon Ocean Ecosystem Survey (JSOES) 19-27 June 2019.*

Seabird surveys – *Conducted eulachon, mammal, and seabird surveys on Columbia River.*

Jeannette Zamon

Monitoring Rhinoceros Auklets and Tufted Puffins – *Fieldwork studying breeding ecology, diet, and habitat use on Protection Island and Destruction Island; Tufted Puffin fecal samples collected from Destruction Island and Point Defiance Zoo for DNA dietary analysis.*

Tom Good

Seabird-cable strikes in catcher-processor fishery – *Designed and funded research led by Amanda Gladics (Oregon SeaGrant) for West Coast at-sea hake catcher-processors.*

Tom Good
Jason Jannot
Vanessa Tuttle

Pacific Islands Regional Office

Demonstration and field trials to evaluate operational practicality and efficacy of tori lines for mitigating Black-footed Albatross interactions in the Hawaii deep-set longline fishery utilizing electronic monitoring technology – *Cooperative research project developing and testing efficacy of "light" tori line design prototypes (Phase 1, completed), and utilizing stern-view "bird cam" electronic monitoring technology to acquire randomized bird strike data with and without tori lines (Phase 2, underway).*

Colby Brady
Sarah Ellgen

Research and Fieldwork

Southeast Fisheries Science Center
Seabird training session – *Training for new US Atlantic pelagic longline observers in Miami, FL.*

Joan Browder

Stellwagen Bank National Marine Sanctuary
Great Shearwater tagging – *Captured and PTT tagged 10 Great Shearwaters around the Stellwagen Bank National Marine Sanctuary (July 2019) as part of long-term habitat use study (2013 - present).*

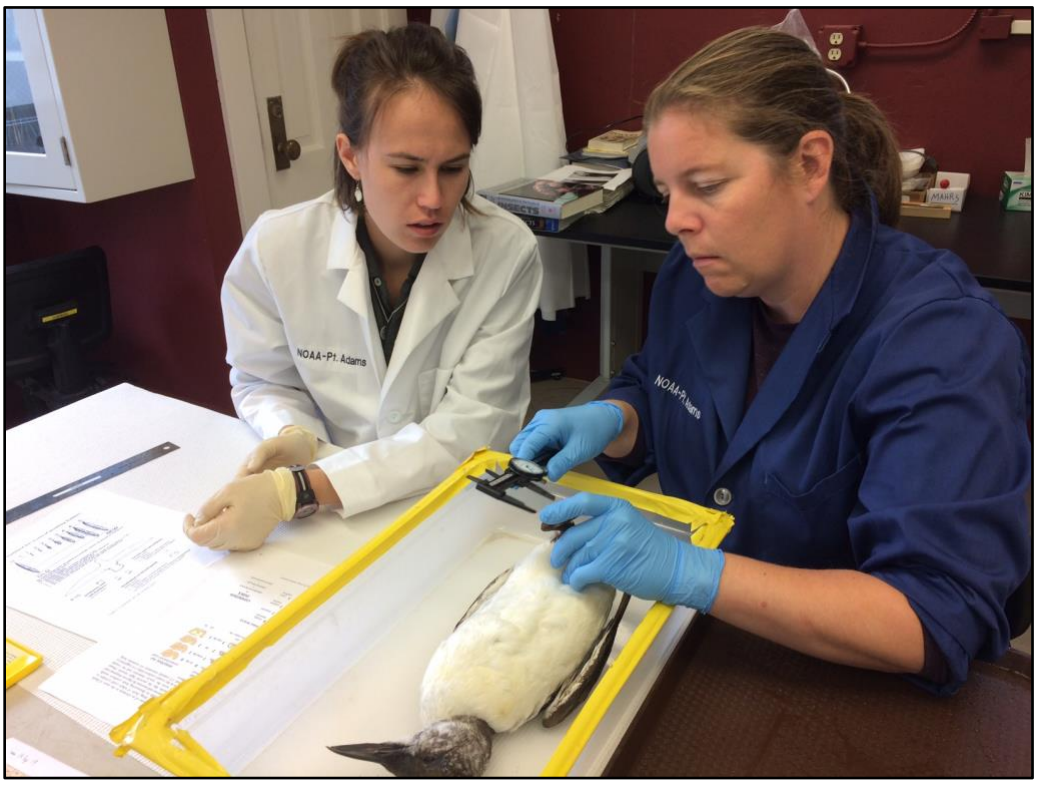
Comparative Great Shearwater Research – *Nancy Foster Scholar and sanctuary team member Anna Robuck, University of Rhode Island, traveled to Cape Town, South Africa to work with collaborators at the University of Cape Town Percy Fitzpatrick Institute of African Ornithology. The team, led by Dr. Peter Ryan, implements a long-term monitoring program at Great Shearwater breeding islands in the South Atlantic and collected key biological samples over the 2017-2018 breeding season to augment ongoing Shearwater research in the sanctuary; Anna is now working with University of Cape Town researchers to necropsy and prepare these samples for further analysis*

David Wiley

Food habit analysis – *Blood, feathers, exhaled gas, and fecal DNA samples were collected from Great Shearwaters, Sooty Shearwaters, and Wilson Storm-Petrels for food habit and stable isotope analysis.*

Plastic ingestion and bycatch demographics for Great Shearwaters from the Gulf of Maine (National Seabird Program funded project) – *Using existing Great Shearwater bycatch data from the Gulf of Maine to fill data gaps regarding bycatch demographics and plastic ingestion, and combining necropsy data with plastic measurement and identification techniques.*

Dave Wiley
Kevin Powers
Anna Robuck
Peter Hong



Common Murre research demographic data collection at Pt. Adams Research Station. Nicole Kleponis, NOAA LMRCSC Graduate Fellow Right: Tiffanie Cross, contractor, Ocean Associates, Inc Photo credit: Jeannette Zamon

Presentations and Meetings

Pacific Seabird Group Meeting, 27 February - 3 March 2019, Lihue, HI

- *Preliminary Findings on the Diet of Laysan Albatrosses, Phoebastria immutabilis, in the Eastern Bering Sea and Aleutian Islands Region*; W.A. Walker, Shannon Fitzgerald, J. Beck, E.L. Donnelly- Greenan
- *Genetic Assignment of Northern Fulmar Bycatch Reveals Contributions from Major Breeding Colonies*; D. Baetscher, J. Beck, M. Hester, Shannon Fitzgerald, H. Nevins J.C. Garza
- *NOAA's National Seabird Program: Advancing Conservation, Sustainable Fisheries, and Ecosystem-Based Management Through a Five-Year Strategic Plan*; Lisa T. Ballance, Annette E. Henry, Trevor Joyce, Thomas P. Good, Robert M. Suryan, Jeannette E. Zamon, Shannon Fitzgerald, Jason Jannot, Jody Van Niekerk
- *Cooperative Monitoring and Outreach Efforts Lead to Declining Human Disturbance to Seabird Nesting Colonies*; C.M. Bednar, G.J. McChesney, R.T. Golightly, Wendy E.C. Kordesch, P. Hobi, Karen Reyna
- *Determinants of Post-Fledging Survival in Translocated Albatross Chicks*; T. Deguchi, Robert M Suryan, F, Sato, K. Ozaki
- *Unraveling the Pacific Northwest Rhinoceros Auklet Mortality Event of 2016*; Thomas Good, S. Pearson, P. Hodum
- *Cryptic Seabird Mortality on U.S. West Coast Pacific Hake Fishing Vessels*; Jason E. Jannot, Tom Good, Vanessa Tuttle
- *Estimates of Newell's Shearwater (Puffinus newelli) and Hawai'ian Petrel (Pterodroma sandwichensis) Abundance and Distribution Based on Data Collected at Sea, 1998-2017*; Trevor W. Joyce, Robert L. Pitman, Lisa T. Ballance
- *Engaging Pilots to Protect Seabird Colonies on the California Coast: Lessons Learned from Ten Years of Outreach and Education*; Wendy E.C. Kordesch, P.S. Hobi, Karen Reyna, G. J. McChesney, C.M. Bednar, R T. Golightly
- *Seabird Bycatch and Mitigation Efforts in Alaska Fisheries Summary Report: 2007 Through 2017*; Joseph R. Krieger, Jennifer Roberts, Shannon M. Fitzgerald, Anne Marie Eich
- *Modeling At-Sea Distributions of Marine Birds on the U.S. Pacific Outer Continental Shelf*; Jeffery Leirness, B. Kinlan, J. Adams, Lisa Ballance, J. Felis, Trevor Joyce, D. Pereksta, Michael Coyne, Arliss Winship
- *Associations Among Mass Mortality Events, Seabird Demography, and Ocean Climate Trends in Central California*; K. Lindquist, P. Warzybok, N. Nur, Jan Roletto, Taylor Nairn, and J. Jahncke
- *The "New Normal" Of Seabird Mass Mortality Events*; J. Lindsey, T. Jones, H. Burgess, J.K Parrish, S. Backensto, V. Bowes, L. Divine, J.E. Dolliver, C. Gibble, J.T. Harvey, P. Hodum, R. Kaler, K. Kuletz, A. Lestenkof, P. Lestenkof, K. Lindquist, P. Melovidov, H.M. Nevins, S. Pearson, J. Piatt, H. Renner, Jan Roletto, M. Romano, G. Sheffield, S. Thomas, L. Wilson
- *Lessons from Seabird Conservation in Alaska Longline Fisheries*; E.F. Melvin, K.S. Dietrich, Robert M. Suryan, Shannon M. Fitzgerald
- *Quantifying Top Down Effects of Bald Eagle (Haliaeetus leucocephalus) Disturbances on a Common Murre (Uria aalge) Colony*; A. Nelson, J. Dolliver, R.A. Orben, Robert M. Suryan, D. Lyons
- *A Season of 'Murre-Th': Increased Reproduction of Common Murres (Uria aalge) at Yaquina Head Colony, Oregon, USA, Following Consecutive Failed Breeding Years*; J. Porquez, J. Dolliver, R. Orben, D. Lyons, Robert Suryan
- *Unmanned Aircraft Systems and Seabird Interactions*; Karen Reyna
- *Plastic Ingestion in Northern Fulmars (Fulmarus glacialis) Captured in Fisheries*; S.S. Schuur, Shannon F. Fitzgerald, S.Y. Ha, S.H. Hong, J.R. Kucklick, W.J. Shim
- *Ecosystem Response to a Marine Heat Wave in the Gulf of Alaska: Seabirds are the Tip of the Iceberg*; Robert Suryan, Stephani Zador, Mandy Lindeberg, M. Arimitsu, J. Piatt, John Moran, J. Straley, H. Coletti, D. Monson, S. Hatch, T. Dean, R. Hopcroft, S. Batten, S. Danielson, B. Konar, K. Iken, Benjamin Laurel, R. Campbell, M.A. Bishop, A. Shaefer, S. Pegau, K. Kuletz, R. Kaler, D. Irons
- *Novel Methods Describe Fine-Scale Albatross-Fisheries Interactions in the North Pacific*; L.G. Torres, R.A. Orben, J. Adams, M. Hester, S.A. Shaffer, M. Conners, K. Ozaki, F. Sato, T. Deguchi, Robert Suryan, D. Koordesma

Presentations and Meetings

NOAA Fisheries National Seabird Program Interagency Meeting, Lihue, HI, February 2019; Inaugural meeting of NOAA Fisheries NSP's Inter-agency included 24 participants from universities, government agencies, and non-governmental agencies; Jen Boyce, Shannon Fitzgerald, Tom Good, Annette Henry, Jason Jannot, Trevor Joyce, Mi Ae Kim, Joseph Krieger, Karen Reyna

Short-tailed Albatross Recovery Team, Lihue, HI, February 2019; Joseph Krieger, Shannon Fitzgerald, Rob Suryan

Protected Species Assessment Workshop (PSAW) II, La Jolla, CA, February 2019; Annette Henry, Jason Jannot, Mridula Srinivasan

North Pacific Albatross Working Group, Lihue, HI, February 2019; Reported on Alaska and West Coast activities and provided updates on Agreement for Conservation of Albatrosses and Petrels (ACAP). Shannon Fitzgerald, Tom Good, Jason Jannot, Mi Ae Kim, Joseph Krieger

Annual meeting of the NOAA Fisheries Alaska Groundfish and Halibut Seabird Working Group, Juneau, AK, March 2019; Anne Marie Eich, Sarah Ellgen, Shannon Fitzgerald, Tom Good, Jason Jannot, Joseph Krieger

Western Pacific Fishery Management Council, March 2019, Honolulu, HI, June 2019; Colby Brady, Sarah Ellgen

Annual report to the North Pacific Fishery Management Council on Seabird Bycatch in Alaska fisheries, Anchorage, AK, April 2019; Presented results from Alaska Seabird Working Group. Anne Marie Eich

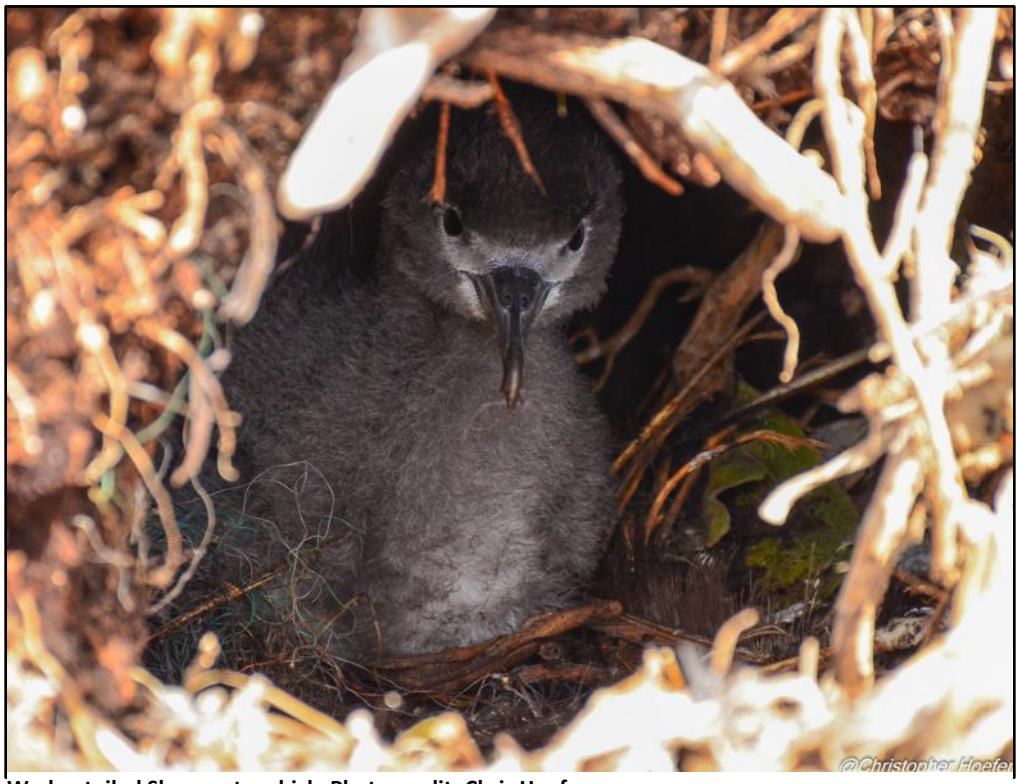
Columbia Gorge Fisheries & Watershed Conference "*The Columbia River Estuary and Plume: What They Are and Why They Matter to Species Recovery in the Columbia Basin,*" The Dalles, OR, April 2019; Jeannette Zamon

National Observer Program Advisory Team, Woods Hole, MA, April & October 2019; Presentation: "*National Seabird Program*," Annette Henry, Trevor Joyce

The 4th World Seabird Twitter Conference (web-based), April 2019, Rob Suryan

Pacific Fishery Management Council, Seattle, WA, April & November 2019; Keeley Kent

Pacific Fishery Management Council Groundfish Endangered Species Workgroup Meeting, Seattle, WA, April/May, 2019; Tom Good, Jason Jannot, Keeley Kent, Rob Suryan



Wedge-tailed Shearwater chick. Photo credit: Chris Hoefer

Presentations and Meetings

Agreement on the Conservation of Albatross and Petrels' (ACAP) Florianopolis, Brazil, May 2019; attended by Jason Jannot, Mi Ae Kim; Shannon Fitzgerald and Rob Suryan provided support

- RFMO Engagement Strategy
- ACAP Seabird Bycatch Working Group
- ACAP Population and Conservation Status Working Group
- ACAP: 11th meeting of the Advisory Committee

US Fish and Wildlife Service Council for the Conservation of Migratory Birds Annual Council Meeting, Washington, DC, May 2019; David Detlor, Mi Ae Kim, Kayleigh Somers, remote: Lee Benaka, Annette Henry

IATTC Bycatch Working Group, San Diego, CA, San Diego, CA, May 2019; Presentation on recommended updates to bring bycatch mitigation in line with ACAP best practice advice; Lisa Ballance, Taylor Debevec, Trevor Joyce, Mi Ae Kim

Protected Species Workshop, San Diego, CA, June 2019; Workshop for longline (deep-set & shallow-set) captains and West Coast Region Observer Program; Colby Brady, Jody Van Niekerk

Protected Species and Aquaculture Workshop, La Jolla, CA, June 2019; Annette Henry

Pacific Fishery Management Council, San Diego, CA, June 2019; Presentation on seabird bycatch mitigation measures; Tom Good, Jason Jannot, Keeley Kent

CCAMLR Working Group on Ecosystem Monitoring and Management, Hobart, Australia, June/July 2019; Jefferson Hinke

NOAA Fisheries Bycatch Reduction Engineering Program, Seattle, WA, July 2019; Lee Benaka, Anne Marie Eich (remote), Shannon Fitzgerald, Annette Henry (remote)

Crested Auklet. Photo credit: Robert L. Pitman

Puget Sound Ecosystem Monitoring Program (PSEMP) Marine Bird Workgroup, Olympia, WA, September and December 2019; Discussion of Puget Sound seabird indicators and vital signs; Tom Good

New Observer Training, Long Beach, CA, September 2019; Regular longline, deep set long line, shallow set long line for exempted fishing permits and drift gillnet swordfish fishery, deep set buoy gear, and linked buoy gear for exempted fishing permits. Jody Van Niekerk

Marine Safety Instructor Training, Sandy Hook, NJ, September 2019; Jody Van Niekerk

Eulachon Technical Recovery and Implementation Team, (forage fish), Arcata, CA, September 2019; Jeannette Zamon

Presentations and Meetings

Retirement Celebration for Ed Melvin, Washington SeaGrant, Seattle, WA, October 2019; Shannon Fitzgerald, Tom Good, Jason Jannot – *Congratulations Ed!*

Oregon State University Marine Studies Initiative Forage Fish Workshop: Connecting the Land and Sea, Newport, OR, October 2019; Tom Good, Jeannette Zamon

Washington SeaGrant Program Review, Seattle, WA, November 2019; Review of collaborative research on seabird bycatch in West Coast longline fisheries with Ed Melvin, Tom Good

2019 Fisheries Innovation for Sustainable Harvest Workshop, Seattle, WA, December 2019; Shannon Fitzgerald

Alaska Salmon Gillnet Fishery/Seabird Interaction Workshop, Anchorage, AK, December 2019; Shannon Fitzgerald

16th Regular Session of the Western and Central Pacific Fisheries Commission (WCPFC16), Port Moresby, Papua New Guinea, December 2019; Emily Crigler

Council for the Conservation of Migratory Birds, 2019 Quarterly staff meetings; Lee Benaka, Annette Henry

Hawai'i Pelagic Tori Line Cooperative Research Project, Oahu, HI, November 2019; Colby Brady, Sarah Ellgen

University of Cape Town Percy Fitzpatrick Institute of African Ornithology, Cape Town, South Africa, May 2019; Nancy Foster Scholar and Stellwagen Banks National Marine Sanctuary team member Anna Robuck gave a presentation on the "SBNMS Great Shearwater Research Program" to faculty, staff, and students at the University of Cape Town Percy Fitzpatrick Institute of African Ornithology. Her talk highlighted SBNMS Shearwater tagging results, sand lance and seabird surveys, stable isotope analyses, plastic ingestion research, and toxicology; David Wiley

Audubon's Shearwater. Photo credit: Trevor Joyce

Publications

(NOAA employees and affiliates in bold)

Ballance, L.T., **Benaka, L.R.**, **Ellgen, S.U.**, **Fitzgerald, S.M.**, **Henry, A.E.**, **Kim, M.**, **Nathanson, S.L.**, and **Joyce, T.W.** 2019. Report of the 2018 Meeting of NOAA Fisheries' National Seabird Program. NOAA Tech. Memo. NMFS-F/SPO-193, Pp. 41.

Benaka, L.R., **Bullock, D.**, Hoover, A.L., and **Olsen, N.A.** (editors). U.S. National Bycatch Report First Edition Update 3. 2019. U.S. Dept. of Commerce, NOAA. NOAA Technical Memorandum NMFS-F/SPO-190, 95 p.

Bi, R., Jiao, Y., Bakka, H., and **Browder, J.A.** 2020. Long-term climate ocean oscillations inform seabird bycatch from pelagic longline fishery. ICES Journal of Marine Science, doi:10.1093/icesjms/fsz255. lines (National Seabird Program funded project).

Fitzgerald, S., **Wallace, F.**, Romain, S., Magrane, K., Kazmerzak, R., Moore, B., and **Kim, M.** 2019. Improving seabird species identification in electronic monitoring applications using machine learning systems. Working Group Information Paper for the Ninth Meeting of the Seabird Bycatch Working Group of ACAP: Florianópolis, Brazil, May 2019. SBWG9 Inf 21.

Good, T.P., **Ward, E.**, **Jannot, J.**, **Shama, R.**, and **McVeigh, J.** 2019. Observed and Estimated Bycatch of Short-tailed Albatross in US West Coast Groundfish Fisheries 2002-2017.

Harvey, C., N. Garfield, G. Williams**, N. Tolimieri, I. Schroeder, K. Andrews, K. Barnas, E. Bjorkstedt, S. Bograd, R. Brodeur, B. Burke, J. Cope,** A. Coyne**, L. deWitt,** J. Dowell**, J. Field, J. Fisher, P. Frey, T. Good, C. Greene, E. Hazen, D. Holland,** M. Hunter**, K. Jacobson, M. Jacox,** C. Juhasz**, I. Kaplan, S. Kasperski, D. Lawson, A. Leising,** A. Manderson**, S. Melin, S. Moore,** C. Morgan**,** B. Muhling**, S. Munsch, K. Norman, R. Robertson,** L. Rogers-Bennett**, K. Sakuma, J. Samhouri,** R. Selden**,** S. Siedlecki**, K. Somers,** W. Sydeman**, A. Thompson, J. Thorson, D. Tommasi, V. Trainer, A. Varney, B. Wells, C. Whitmire, M. Williams, T. Williams, J. Zamon, and S. Zeman.** 2019. Ecosystem Status Report of the California Current for 2019: A Summary of Ecosystem Indicators Compiled by the California Current Integrated Ecosystem Assessment Team (CCEIA). U.S. Department of Commerce, NOAA Technical Memorandum NMFS-NWFSC-149.

Hong, P., **Wiley, D.N.**, Powers, K.D., Michener, R.H., Kaufman, L. and Hatch, K.A. 2019. Stable Isotope Analyses of Multiple Tissues of Great Shearwaters (*Ardenna Gravis*) Reveals Long-Term Dietary Stability, Short-Term Changes in Diet, and Can be Used as a Tool to Monitor Food Webs. Diversity, 11: 163.

Jannot, J.E., **Good, T.P.**, **Tuttle, V.**, **Eich, A.M.**, **Fitzgerald, S.**, **Kim. M.** 2019. Summary Report of the U.S. West Coast and Alaska Trawl Fisheries Seabird Cable Strike Workshop. Working Group Information Paper for the Ninth Meeting of the Seabird Bycatch Working Group of ACAP: Florianópolis, Brazil, May 2019. SBWG9 Inf 20.

Jannot, J.E., **Somers, K.A.**, **Tuttle, V.**, **McVeigh, J.**, **and Good, T.P.** 2018. Seabird Mortality in U.S. West Coast Groundfish Fisheries, 2002–16. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-NWFSC-146. Pp. 146. Jannot, J.E. T.P. Good, K. Somers, V. Tuttle, and J. McVeigh.

Krieger, J.R., **Eich, A.M.**, and **Fitzgerald, S.M.** 2019. Seabird Bycatch Estimates for Alaska Groundfish Fisheries: 2018. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-F/AKR-20, Pp. 41.

Publications

Loredo, S.A., Orben, R.A., **Suryan, R.M.**, Lyons, D.E., Adams, J. and Stephensen, S.W. 2019. Spatial and temporal diving behavior of non-breeding common murres during two summers of contrasting ocean conditions. Journal of Experimental Marine Biology and Ecology, 517: 13-24.

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Outreach and Other Accomplishments

Alaska Regional Office

Seabird ID and Avoidance Measures handouts – *Distributed to NOAA Alaska Law Enforcement offices to be shared with fishers.*

Anne Marie Eich
Joseph Krieger

Northwest Fisheries Science Center

Short-tailed Albatross and seabird bycatch – *Provided data to inform new Biological Opinion in Pacific halibut Area 2A derby fishery as part of restructuring management of fishery.*

International outreach – *Provided seabird data and advice to scientists in Argentina, New Zealand, and United Kingdom.*

Jason Jannot

NOAA Hollings Scholar – *Mentored Anna Wuest in Bayesian modeling of Black-footed Albatross bycatch in US West Coast longline fisheries.*

Tom Good
Jason Jannot

Living Marine Resources Cooperative Science Center NOAA Graduate Fellow – *Mentored Nicole Kleponis in seabird diet and fish sampling through to successful defense of master's thesis on Red-throated Loons (Delaware State University).*

Wings Over Willapa Outreach – *Led pelagic seabird trip for U.S. Fish & Wildlife Service Refuge public event.*

Jeannette Zamon

Observer program – *Hired three seabird observers to collect data in 2019 aboard at-sea hake catcher processors (in collaboration with Oregon SeaGrant Program.)*

West Coast Seabird Avoidance Measures handouts – *The West Coast Groundfish Observer Program provided handouts to new and returning observers.*

Ryan Shama

Office of Science and Technology

Web story: Oikonos seabird necropsy program – *https://www.fisheries.noaa.gov/feature-story/dead-seabirds-do-tell-tales-how-fishery-observers-help-provide-data-seabird-management*

Andrea Chan (Knauss Fellow)

Office of International Affairs and Seafood Inspection

Translations of updated ACAP-BirdLife International fact sheets on seabird bycatch mitigation measures for pelagic longline gear – *translated into Korean, Mandarin, Taiwanese (traditional Chinese), Japanese, Indonesian, Portuguese (Brazilian), Spanish, and French.*

Mi Ae Kim

Pacific Islands Regional Office

Cooperative research grant – *Awarded to develop Hawaiian longline tori lines utilizing electronic monitoring technology to monitor bird strikes.*

Colby Brady
Sarah Ellgen

Stellwagen Bank National Marine Sanctuary

Seabird Tagging Project – *Follow Great Shearwater PTT bird movements and updates on Twitter @trackseabirds.*

David Wiley

Synergistic Outreach & Other Accomplishments

Alaska Fisheries Science Center/Northwest Fisheries Science Center/West Coast Region

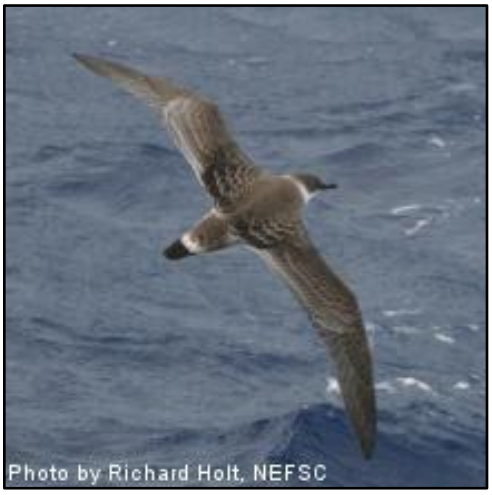
Outreach opportunity – *Drafting vessel specific bycatch reports and conducting internal discussions exploring outreach opportunities.*

Shannon Fitzgerald
Tom Good
Jason Jannot
Keeley Kent
Joseph Krieger
Ryan Shama
Kayleigh Somers
Rob Suryan
Jon McVeigh

Seed funding for these projects was provided by the Office of Science and Technology's National Observer Program

Plastic Ingestion and Bycatch Demographics of Great Shearwaters from the Gulf of Maine

David Wiley, Stellwagen Bank National Marine Sanctuary, David.Wiley@noaa.gov; Joshua Hatch, Northeast Fisheries Science Center, Joshua.Hatch@noaa.gov; Anna Ruth Robuck, University of Rhode Island, Gwyneth Emery, University of Rhode Island, Christy Hudak, Center for Coastal Studies, Johanna Pedersen, Integrated Statistics, Inc.



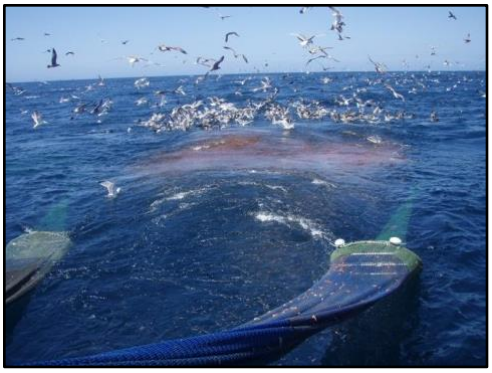
Great Shearwater. Photo credit: Richard Holt

Since 1950 globally monitored seabird populations have declined significantly, with possible causal factors including plastic pollution, fisheries bycatch, and climate change. Seabirds are particularly prone to plastic ingestion and are excellent indicators of plastic pollution. Procellariiformes, like Great Shearwaters (GRSH; *Ardenna gravis*), are particularly prone to plastic ingestion with 71% of sampled GRSH from 2005 – 2008 along the U.S. East Coast containing at least one piece of plastic (n = 17). Surface water plastic abundance is correlated with plastic production, which is slated to quadruple by 2050. Therefore, seabird plastic ingestion will likely increase with unknown consequences for seabird population resilience. Anecdotally, this hypothesis has been supported with 94% of juvenile GRSH examined in 2017 containing at least one piece of plastic (n = 19; Anna Robuck *pers. comm.*). This project will make use of an existing dataset of necropsied GRSH collected by fisheries observers from the Gulf of Maine during 2007 – 2018. An additional 30 GRSH collected in 2019 will be necropsied to supplement the existing dataset. Ingested plastic debris from 6 – 12 necropsied GRSH per year will be analyzed to identify polymer type (n ≈ 1000 plastic pieces from ~100 GRSH). Modeling techniques will then be used to assess relationships between plastic metrics and polymer identity with the GRSH necropsy data, which also includes demographic information (e.g., sex, age, and overall basic health). This project will be one of the first to comprehensively measure plastic ingestion by GRSH and to assess plastic polymer identity relevant to a regional species.

Develop International Collaborations to Reduce Seabird Bycatch in US and Global Trawl Fisheries during ACAP's Seabird Bycatch Working Group Meeting

Jason E. Jannot, Northwest Fisheries Science Center, Jason.Jannot@noaa.gov, Mi Ae Kim, Office of International Affairs and Seafood Inspection, Shannon Fitzgerald, NOAA Alaska Fisheries Science Center

The objective of the Agreement on the Conservation of Albatrosses and Petrels (ACAP) is to achieve and maintain a favorable conservation status for albatrosses and petrels through improved conservation measures, research and information exchange, and increased public awareness of the threats facing seabirds. Incidental capture in fisheries is a major threat to the species covered by ACAP and the agreement prioritizes monitoring and mitigating seabird mortalities. Given the interest of NOAA Fisheries, and particularly of the National Seabird Program, in seabird conservation, participation by program members in ACAP meetings will enhance NOAA science.



Hake fishery trawl. Photo credit: At-Sea Hake Observer Program.

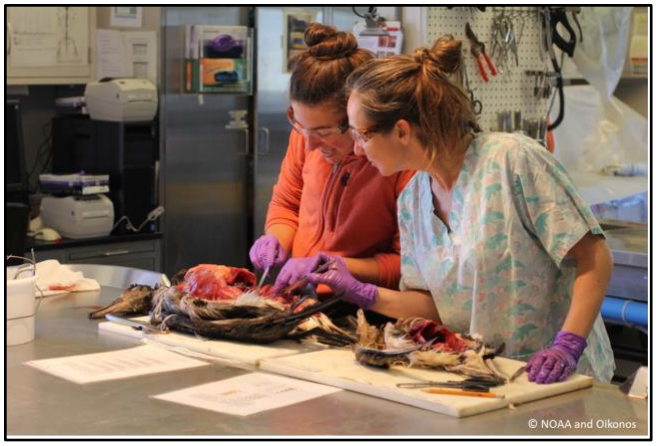
By attending the ACAP 9th Seabird Working Group Meeting, we will:

1. Develop collaborative relationships with international scientists and managers to study and develop effective mitigation strategies for seabird bycatch
2. Communicate seabird bycatch research and mitigation efforts on the US West Coast and Alaska, via discussions, informal meetings and an Informational Paper to the Seabird Working Group.
3. Increase NOAA's expertise in seabird bycatch by learning from international scientists to help inform bycatch mitigation strategies in U.S. fisheries.

Our educational and outreach efforts on seabird bycatch mitigation strategies are directly applicable to one of the National Seabird Program's strategic planning focus – Mitigation of Seabird Bycatch. Recent work conducted by the Northwest and Alaska Fisheries Science Centers addressing bycatch in trawl and other fisheries will be shared with international partners. As a world leader in bycatch mitigation, NOAA/National Seabird Program scientists can provide valuable expertise from our experiences with U.S. fisheries. Meeting attendance promotes continued communication and keeps National Seabird Program scientists at the forefront of international standards on reducing seabird bycatch.

Pacific Seabird Bycatch Necropsy Program

Shannon Fitzgerald, Alaska Fisheries Science Center, shannon.fitzgerald@noaa.gov, Michelle Hester, Oikonos Ecosystem Knowledge, Inc., Jennifer Ferdinand, Alaska Fisheries Science Center, Cassandra Donovan, Northwest Fisheries Science Center

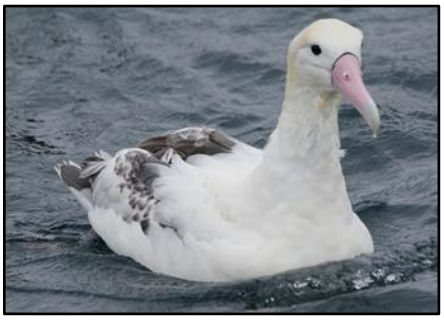


Seabirds are examined in Santa Cruz, CA for health, diet, and plastic ingestion metrics. Photo credit: Oikonos and NOAA

This project makes important use of bycatch seabirds, providing specimens and information incomparable to any known dataset. Observers in Alaska, Hawaii, and US West Coast fisheries collect primarily procellarid seabirds from commercial fishing bycatch which are then sent to Oikonos, co-located with the Marine Wildlife Veterinary Care and Research Center, Santa Cruz, CA. Birds are necropsied and tissue samples are saved in negative 50 degree freezers, various demographic data are collected and the stomachs removed. Stomachs are examined for plastics and natural food items, then shipped back to the Alaska Fisheries Science Center for their food habits project. Data are used to refine estimates of the impacts of bycatch on populations, provide ecosystem modeling information, and monitor changes in the marine environment. Several items noted as high priority in the U.S. Fish & Wildlife Service Laysan and Black-footed Albatross Conservation Action Plan can only be addressed through this project. Many of the results directly apply to collaborative work between NOAA Fisheries and the Fish & Wildlife Service. This program has been in place since 2007 and represents a valuable time-series of seabird data in support of a variety of activities. To date, over 3,500 birds have been examined.

Streamer Line Distribution in Alaska Longline Fisheries

Anne Marie Eich, Alaska Regional Office AnneMarie.Eich@noaa.gov, Joseph Krieger, Alaska Regional Office



Short-tailed Albatross. Photo credit: Rob Suryan

This project will provide fishers with streamer lines to reduce the incidental mortality of seabirds in the hook-and-line fisheries off Alaska. Seabird avoidance measures, specifically streamer lines, reduce the incidental mortality of seabirds in the hook-and-line fisheries off Alaska by nearly 100% when properly deployed (see research). Streamer lines have been required since 2004 (see history). It is likely that the incidental mortality of seabirds in the hook-and-line fisheries off Alaska could be further reduced on many vessels with new streamer line gear. We will purchase up to 60 pairs of streamer lines that will be distributed through select National Marine Fisheries Service Law Enforcement Offices in Alaska.

In Alaska, seabird avoidance measures are required to be used by operators of vessels > 26 ft length overall using hook-and-line gear fishing for Individual Fishing Quota halibut, Community Development Quota halibut, or Individual Fishing Quota sablefish in the EEZ off Alaska or State of Alaska waters (0 to 200 nm combined); or groundfish in the EEZ off Alaska (3 to 200 nm). Vessels > 55 ft length overall in the U.S. Exclusive Economic Zone must use a minimum of a paired streamer line of a specified performance and material standard. Vessels > 26 ft length overall; and ≤ to 55 ft length overall must use a minimum of a single streamer line or, in limited instances, a minimum of one buoy bag line. Limited exemptions from seabird avoidance regulations exist. Other than noted above, vessel operators using hook-and-line gear and fishing for groundfish in waters of the State of Alaska must refer to State regulations (see 5AAC 28.055).

Can species-specific seabird bycatch of the US Atlantic Pelagic Longline fleet be estimated effectively? Application of a Bayesian approach

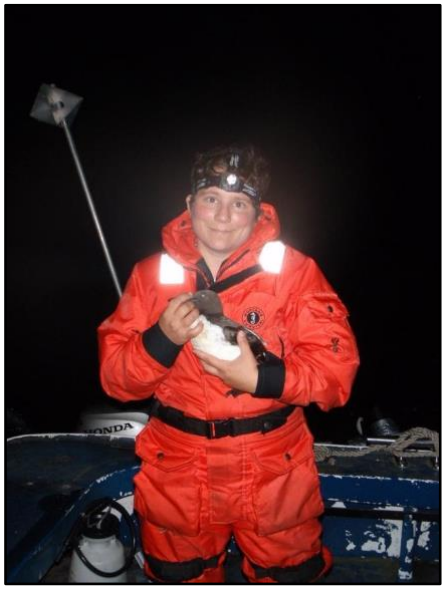
Joan A Browder, Southeast Fisheries Science Center, joan.browder@noaa.gov, with Yan Jiao, Virginia Polytechnic Institute and State University

Laughing Gull. Photo credit: NOAA

Bayesian approaches were introduced into the seabird bycatch estimation methodology at Virginia Tech (Dr. Yan Jiao) in FY 2018 to improve the accuracy of estimations of fleet bycatch and expand modeling capability. A Bayesian delta generalized linear model with random-year-effect and a modified Conway-Maxwell-Poisson distribution was selected, based on DIC, as the best model to estimate total seabird bycatch and was used for the first time to generate estimates of total bycatch and annual estimated bycatch from 1992 through 2017. A Bayesian hierarchical modeling approach was applied to species-specific bycatch predictions that expanded the species predicted as bycatch beyond those ever reported caught by the U.S. Atlantic pelagic longline fleet to others that forage in the fleet's footprint off the U.S. middle Atlantic coast. To make these predictions, species were linked through similarity analysis based on size and ecological characteristics. Another application of the Bayesian approach was a probability model that produced an estimate of total bycatch that included a first approximation of the number of birds caught as the line was being set, including those lost from the hook before being hauled back to the vessel to be counted (bycatch loss). The approximation was based on exceptionally comprehensive are planned for 2019. Acquiring better estimates of (1) species-specific bycatch, (2) observation probability of catching a rare bird, (3) recording-bias in seabird bycatch estimation, and (4) hot spot locations and their shifts may help resource managers clarify the need for improved observer coverage and application of bycatch reduction strategies.

Advancing EBFM Principles by Establishing Food Web Links Between Seabirds and Forage Fish Species in the Northern California Current

Jeannette E. Zamon, Northwest Fisheries Science Center, Jen.Zamon@noaa.gov



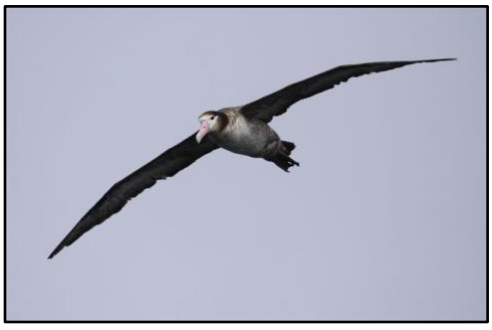
Jeannette Zamon with Common Murre. Photo credit: NOAA

Ecosystem-based fisheries management (EBFM) requires an understanding of food web links among fish, fish predators, and regions of high ecosystem productivity in order to meet the core objective of multi-species management in an ecosystem context. Patterns of seabird distribution and habitat use have identified the Columbia River Plume as an important oceanographic feature supporting high species abundance of fish-eating seabirds during summer. However, there are no contemporary quantitative diet data linking the two numerically-dominant seabird species using this region (common murres, *Uria aalge*; sooty shearwaters, *Ardenna grisea*) to the fish species actually being consumed. Published data for this region are all 38 years old or older. Considering recent ecosystem shifts in ocean conditions and marine communities, EBFM requires updated seabird diet data sets for contemporary ecosystem models that include forage fishes and seabirds to properly consider multi-species relationships when considering management options.

The objective of this study would be to advance EBFM Road Map Guiding Principles 2 (Advance our understanding of ecosystem processes) and 5 (Incorporate ecosystem considerations into management advice) by documenting the diet composition of common murres and sooty shearwaters during the upwelling (June-August) summer periods. We will use live-capture of birds at night to obtain diet samples through non-lethal stomach lavage techniques. New diet composition data would begin to fill an important gap in our knowledge of food web links between forage fishes and numerically abundance upper-trophic level predators in the northern California Current.

Seabird Training for Alaska Groundfish Observers – Coastal Observation and Seabird Survey Team (COASST)

Shannon Fitzgerald, Alaska Fisheries Science Center, shannon.fitzgerald@noaa.gov, Dr. Julia Parrish, University of Washington Coastal Observation and Seabird Survey Team (COASST), Hillary Burgess, Coastal Observation and Seabird Survey Team (COASST)



Short-tailed Albatross. Photo credit: NOAA

The U.S. Fish & Wildlife Service and the Alaska Fisheries Science Center worked closely during the high seas driftnet program, 1989-1993 to provide seabird training to observers. Based on this collaboration, observer duties in the AFSC North Pacific Groundfish Observer Program were expanded to include seabird observation and bycatch monitoring. Shannon Fitzgerald of the AFSC and Dr. Patrick Gould of the USFWS worked together to develop supporting materials for observers, including species ID training. More than 400 observers annually go through observer certification training or annual pre-deployment briefings. Species ID was especially important due to the rare bycatch of the endangered Short-tailed albatross and has since been included as a requirement in the Biological Opinion. This project continues basic support for training observer's seabird ID and seabird responsibilities.

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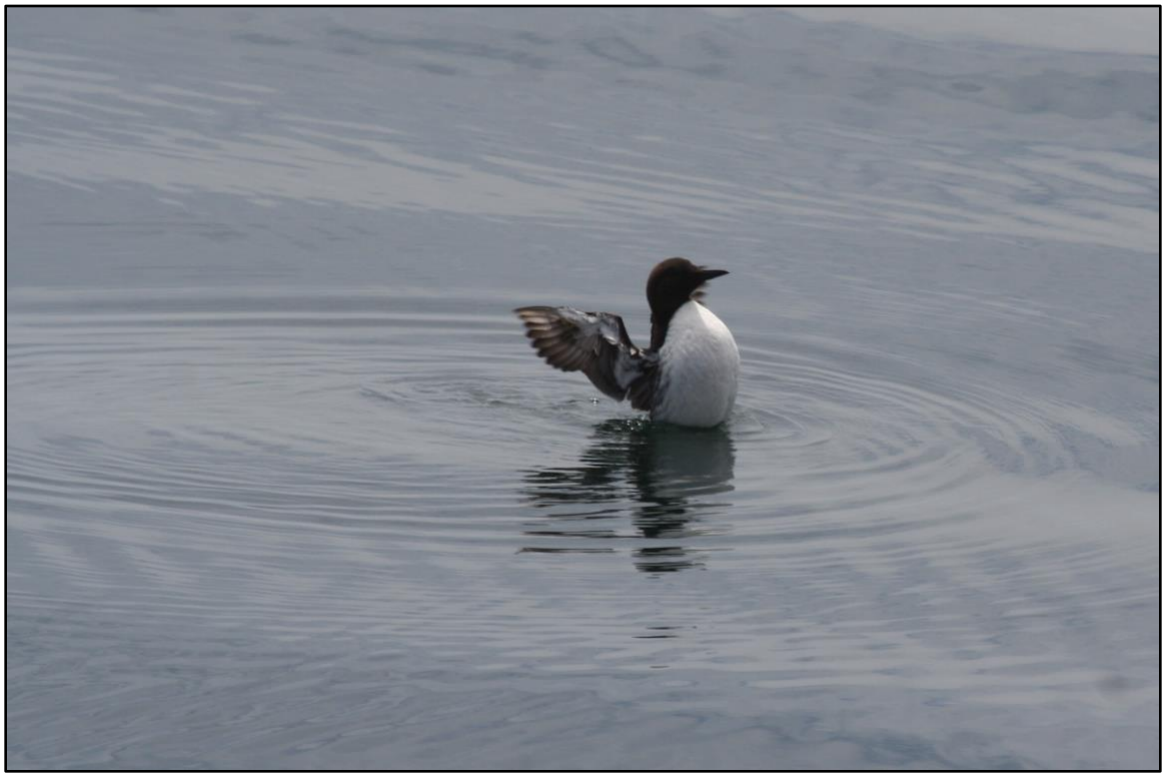
Stephani Zador
Jeannette Zamon

*With the departure of Dr. Lisa T. Ballance to Oregon State University in September, Annette Henry became coordinator of the National Seabird Program.



Common Murre stretching. Photo credit: Jeannette Zamon